REMARKS

The present Amendment amends claims 1, 3, 9, 10, 12, 14, 19-21 and 25-38 and leaves claims 4-7, 13, 15, 16, 18 and 22-24 unchanged. Therefore, the present application has pending claims 1, 3-7, 9, 10, 12-16 and 18-38.

Claim 14 stands objected to due to informalities noted by the Examiner in paragraphs 3 and 4 of the Office Action. Amendments were made to claim 14 to correct the informalities noted by the Examiner. Therefore, this objection is overcome and should be withdrawn.

Claims 25-38 stand rejected under 35 USC §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regards as their invention. Amendments were made to claims 25-38 to overcome the 35 USC §112, second paragraph rejection. Therefore, reconsideration and withdrawal of this rejection with respect to claims 25-38 is respectfully requested.

Claims 1, 3, 4, 6, 7, 9, 10, 12-16, 18-24 and 32-38 stand rejected under 35 USC §102(b) as being anticipated by Takahashi (U.S. Patent No. 6,259,705 B1), claim 5 stands rejected under 35 USC §103(a) as being unpatentable over Takahashi in view of Bare (U.S. Patent No. 6,456,597 B1) and claims 25-31 stand rejected under 35 USC §103(a) as being unpatentable over Takahashi in view of Bare. These rejections are traversed for the following reasons. Applicants submit that the features of the present invention as now more clearly recited in claims 1, 3-7, 9, 10, 12-16 and 18--38 are not taught or suggested by Takahashi or Bare whether taken individually or in combination with each other as suggested by the Examiner. Therefore,

Applicants respectfully request the Examiner to reconsider and withdraw these rejections.

The features of the present invention now more clearly recited in the claims are not taught or suggested by any of the references of record whether taken individually or in combination with each other. Particularly the above described features of the present invention now more clearly recited in the claims are not taught or suggested by Takahashi or Bare.

The present invention is directed to a system having first, second and third devices and a plurality of paths each being connected between the first and second device and the third device being connected to the first device. The present invention is also directed to a storage system connected to another storage system by a plurality of paths each being connected between the storage system and the another storage system.

According to the present invention in the system the first device transfers data, using a plurality of packets, to the second device across the plurality of paths, wherein each of the packets includes an address of the first device as a source address, an address of the second device as a destination address and a portion of the data to be transferred from the first device to the second device and wherein the number of packets transferred on each path of the plurality of paths is set according to a predetermined ratio for the each path.

Further, according to the present invention the predetermined ratio for the each path defines an amount of packets to be allocated on the each path relative to a total amount of packets on all of the paths so that packets on the each path of the plurality of paths are adjusted relative to the packets on each

of the other paths such that a total amount of packets across the plurality of paths carries sufficient data equal to a total of the data to be transferred from the first device to the second device. When the third device detects congestion of packets on one path of the plurality of paths, the third device notifies the first device of the congestion on the one path.

Still further, the first device changes the predetermined ratio of each of the paths, thereby changing the amount of packets to be allocated to each of the plurality of paths, based on notification from said third device of the congestion on the one path and the first device transfers data, using the packets, to the second device across the plurality of paths according to the changed predetermined ratio of each of the paths.

Still further yet, the first device and the second device are storage devices each having a disk drive for storing data and the third device has information on the predetermined ratio and a change rate to be applied to the predetermined ratio of each of the paths to compute the changed predetermined ratio of each of the paths, when a change in the predetermined ratio of each of the paths is required, wherein the change rate is a predetermined minimum value the predetermined ratio is to be increased or decreased when changed.

Even further, the third device, when congestion on the one path has been detected, computes the changed predetermined ratio on each of the paths based on the change rate, and sends information on the changed predetermined ratio of each of the paths to the first device, and the first device transfers data, using packets, to the second device across the plurality of paths based on the changed predetermined ratio of each of the paths.

Amendments were made to each of the claims so as to more clearly recite features of the present invention regarding the distinguishing features of the present invention. Particularly the amendments more clearly recite that data is transferred using packets each having source and destination addresses of the first and second devices and carrying a portion and that the number of packets transferred on each path is set according to a predetermined ratio for the path. In addition the amendments more clearly recite that the predetermined ratio for each path defines an amount of packets to be allocated on the path relative to a total amount of packets on all of the paths, that the packets on the each path are adjusted relative to the packets on each of the other paths such that the total packets across the paths carries data equal to the data to be transferred, and that when a change in the predetermined ratio of each path is required, a change rate having a predetermined minimum value is applied to the predetermined ratio, thereby setting the amount the predetermined ratio is to be increased or decreased when changed.

The above described features of the present invention now more clearly recited in the claims are not taught or suggested by any of the references of record whether taken individually or in combination with each other. Particularly, the above described features of the present invention as now more clearly recited in the claims are not taught or suggested by Takahashi or Bare whether said references are taken individually or in combination with each other as suggested by the Examiner.

Takahashi relates to load balancing between a plurality of second control units that receive packets having data from a first control unit and discloses that a conversion information storage unit stores a correspondence relationship between the first control unit and the second control units, a distributive relay unit transfers data from the first control unit to one or more of the second control units, a load measurement unit measures the load conditions of the respective second control units, thereby balancing, based on the measured load conditions, the correspondence relationship between the first control unit and the second control units (see col. 5, lines 18-36). In Fig. 2, of Takahashi the first control unit is the client computer and the second control units are the servers. In other words, Takahashi is concerned with the adjustment of the load balance between the servers and does not include the features of the present invention where the amount of packets on each of a plurality of paths is controlled according a predetermined ratio for the path.

According to the present invention congestion of packets on each path is detected rather than the load placed on the one second device as recited in the claims. Takahashi is intended to balance the loads on a plurality of servers so as to avoid an overload condition on anyone of the servers. Thus, in Takahashi the intent is to detect when an overload condition on a server has occurred and re-adjusting the loads on the servers to eliminate the detected overload condition.

The present invention is intended to distribute packets to be transmitted across a plurality of paths based on a predetermined ratio for each path and to re-adjust the predetermined ratio for each path if a congestion of packets is detected on one of the paths. Thus, the present

invention detects congestion of packets on a path rather than the load on a server. Therefore, the present invention detects an entirely different parameter, namely congestion of packets on a path, than the parameter detected by Takahashi. In Takahashi the load on each of the servers is measured. Accordingly, according to the present invention a congestion of packets on a particular path may be detected even though an overload condition of the second device has not measured and vice-versa a congestion of packets on a particular path may not be detected even though an overload condition of the second device has been measured.

Further, according to the present invention each of the packets includes addresses to identify that the packets are sent from one first device identified by the source address to one second device identified by the destination address. In Takahashi, although packets are used, the packets are each addressed to identify a first device as the source and different ones of the servers as different destinations. Attention is directed to Fig. 1 of Takahashi wherein each of the packets are addressed to a different server, namely IP1, IP2 or IP3. Thus, in Takahashi although a single source is used, the packets are sent, not to a single destination, but to a plurality different destinations contrary to the present invention. In the present invention each packet is sent to the same destination albeit by a different path.

Still further, according to the present invention each packet carries a portion of the data to be transferred from the first device to the second device. There is no such teaching in Takahashi.

Still further yet, according to the present invention when a change in the predetermined ratio of each path is required, a change rate having a

predetermined minimum value is applied to the predetermined ratio, thereby setting the amount the predetermined ratio is to be increased or decreased when changed.

As now more clearly recited in the claims the present invention is directed to a system where a first device transfers data to a second device via a plurality of paths, wherein a third device includes means for managing, for each path, the "predetermined ratio" of an amount of data the first device transfers to each of the paths relative to the total amount of data the first device transfers to all of the paths and "ratio change rate" employed when congestion occurs (see 222 in Fig. 2B and page 16, line 8 through page 17, line 11), and means for re-computing the predetermined ratio of each path based on the above change rate when congestion of the paths is detected (see 211 and 212 in Fig. 2B, Figs 10-12, and page 33, line 5 through page 37, line 25) and notifying the result of computation to the first device. These features of the present invention now more clearly recited in the claims are not taught or suggested by Takahashi.

There is no similar teaching in Takahashi. In the Office Action the Examiner alleges that Takahashi teaches the predetermined ratio and the predetermined change rate in column 5, lines 26-38. However, there is no such teaching at this or at any point in Takahashi of the predetermined change rate as alleged by the Examiner.

Thus, Takahashi fails to teach or suggest that the first device transfers data, using a plurality of packets, to the second device across the plurality of paths, wherein each of the packets includes an address of the first device as a source address, an address of the second device as a destination

address and a portion of the data to be transferred from the first device to the second device and wherein the number of packets transferred on each path of the plurality of paths is set according to a predetermined ratio for the each path as recited in the claims.

Further, Takahashi fails to teach or suggest that the predetermined ratio for the each path defines an amount of packets to be allocated on the each path relative to a total amount of packets on all of the paths so that packets on the each path of the plurality of paths are adjusted relative to the packets on each of the other paths such that a total amount of packets across the plurality of paths carries sufficient data equal to a total of the data to be transferred from the first device to the second device. When the third device detects congestion of packets on one path of the plurality of paths, the third device notifies the first device of the congestion on the one path as recited in the claims.

Still further, Takahashi fails to teach or suggest that the first device changes the predetermined ratio of each of the paths, thereby changing the amount of packets to be allocated to each of the plurality of paths, based on notification from said third device of the congestion on the one path and the first device transfers data, using the packets, to the second device across the plurality of paths according to the changed predetermined ratio of each of the paths as recited in the claims.

Still further yet, Takahashi fails to teach or suggest that the first device and the second device are storage devices each having a disk drive for storing data and the third device has information on the predetermined ratio and a change rate to be applied to the predetermined ratio of each of the

paths to compute the changed predetermined ratio of each of the paths, when a change in the predetermined ratio of each of the paths is required, wherein the change rate is a predetermined minimum value the predetermined ratio is to be increased or decreased when changed as recited in the claims.

Even further, Takahashi fails to teach or suggest that the third device, when congestion on the one path has been detected, computes the changed predetermined ratio on each of the paths based on the change rate, and sends information on the changed predetermined ratio of each of the paths to the first device, and the first device transfers data, using packets, to the second device across the plurality of paths based on the changed predetermined ratio of each of the paths as recited in the claims.

Therefore, Takahashi fails to teach or suggest the features of the present invention as recited in the claims and as such does not anticipate nor render obvious the claimed invention. Accordingly, reconsideration and withdrawal of the 35 USC §102(b) rejection of claims 1, 3, 4, 6, 7, 9, 10, 12-16, 18-24 and 32-38 as being anticipated by Takahashi is respectfully requested.

The above noted deficiencies of Takahashi are not supplied by any of the other references of record. Particularly, the above noted features of the present invention as recited in the claims shown above not to be taught or suggested by Takahashi are also not taught or suggested by Bare. Thus, combining the teachings of Takahashi and Bare in the manner suggested by the Examiner in the Office Action still fails to teach or suggest the features of the present invention as clearly recited in the claims.

Bare is merely relied upon by the Examiner for an alleged teaching of providing a notification by an SNMP Trap.

However, at no point is there any teaching or suggestion in Bare of the above described features of the present invention now more clearly recited in the claims shown above to not be taught or suggested by Takahashi. Thus, as is clear from the above, Bare suffers from the same deficiencies relative to the features of the present invention as now more clearly recited in the claims as Takahashi.

Therefore, since Takahashi and Bare suffer from the same deficiencies relative to the features of the present invention as now more clearly recited in the claims, combining the teachings of Takahashi and Bare in the manner suggested by the Examiner in the Office Action does not render obvious the claimed invention. Accordingly, based on the above, reconsideration and withdrawal of the 35 USC §103(a) rejections of claims 5 and 25-31as being unpatentable over Takahashi in view of Bare is respectfully requested.

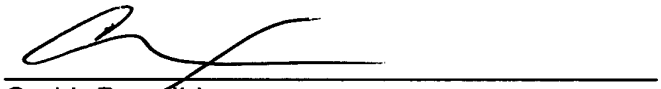
The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the references utilized in the rejection of claims 1, 3-7, 9, 10 and 12-16 and 18-38.

In view of the foregoing amendments and remarks, applicants submit that claims 1, 3-7, 9, 10 and 12-16 and 18-38 are in condition for allowance. Accordingly, early allowance of claims 1, 3-7, 9, 10 and 12-16 and 18-38 is respectfully requested.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C., Deposit Account No. 50-1417 (TMI-5039).

Respectfully submitted,

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.



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